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UNITED STATES DEPARTMENT OF AGRICULTURE  
Bureau of Entomology and Plant Quarantine  
Washington, D. C.

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Superseding PQQA--329.

April 8, 1938.

ADMINISTRATIVE INSTRUCTIONS

STERILIZATION OF GRAPEFRUIT AND ORANGES BY HEAT UNDER THE  
MEXICAN FRUITFLY QUARANTINE

(Approved April 5, 1938; effective April 8, 1938)

INTRODUCTORY NOTE

Investigations in sterilizing fruit for the Mexican fruitfly have shown that the holding period at  $110^{\circ}$  F. can be reduced from 8 to 6 hours provided the time for heating the fruit to this temperature is at least 3 hours, making a minimum treating period of 14 hours. In order that shippers may take advantage of this reduction, the administrative instructions issued as circular PQQA-329 on March 3, 1938, are modified and superseded by the following instructions.

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Under the authority contained in paragraph (e) of regulation 6 of the Mexican fruitfly quarantine regulations, as revised effective October 15, 1937, and having determined that shipments of unsterilized oranges and grapefruit from infested areas might involve risk of spread of the Mexican fruitfly, notice is hereby given that sterilization is required as a condition of issuance of permits for the interstate movement of oranges and grapefruit produced in areas designated by the Chief of the Bureau of Entomology and Plant Quarantine as infested. Such sterilization shall be in accordance with one of the following prescribed treatments:

(1) Heating the fruit to a temperature of  $110^{\circ}$  F. or above (not to exceed  $112^{\circ}$ ) in the approximate center of the fruit and holding the temperature of  $110^{\circ}$  or above (not to exceed  $112^{\circ}$ ) for a period of 3 hours;

(2) Heating the fruit for a period of not less than 14 hours during which time the fruit shall be raised to a temperature of  $110^{\circ}$  F. at the approximate center of the fruit and shall be maintained at or above that temperature for the last 6 hours of such treatment.

No specifications as to the exact methods and equipment for obtaining these conditions are prescribed. Available information clearly indicates that by the application of dry heat the required temperatures cannot be reached without injury to the fruit. To prevent such injury it is necessary to maintain a very high humidity throughout the period of treatment. In the tests where successful performance was obtained, live steam as the source of heat was applied in such a way as to secure as nearly as possible a uniform distribution of steam-heated air so directed as not to discharge directly on the fruit.



The air temperature ranged from  $110^{\circ}$  to  $112^{\circ}$  F. and the air was very moist. The fruit was held in field boxes stacked four boxes high and without special means of separating the boxes in each stack. The experiments indicate that the fruit should be sterilized after coloring, if this is necessary, and before packing for shipment, and then cooled down to a temperature around  $45^{\circ}$  F. as soon as possible after sterilizing. Wax or paraffine, either dry or in solution, should not be applied to this fruit either before or after sterilization.

Such treatment is authorized in sterilization plants in the regulated area which are approved by the Bureau of Entomology and Plant Quarantine. The Bureau will approve only those plants which are adequately equipped to handle and sterilize the fruit. Such sterilization will be done under the supervision of inspectors of the Bureau. These inspectors should at all times be given access to fruit while in process of sterilization. They will supervise the movement of the fruit from the car to and from the sterilizing rooms.

While the results of the experiments so far conducted have been successful, it should be emphasized that inexactness and carelessness in operation may result in injury to fruit. In authorizing the movement of fruit sterilized in accordance with the above requirements, it is understood that the Department does not accept responsibility for fruit injury.

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